

Chapter 5

First 1000 Days and Beyond: Strategies to Achieve the Sustainable Development Goals



Maureen M. Black and Katherine A. Merseth

Equity and universal prosperity are the central themes of the Sustainable Development Goals (SDGs), the global agenda through 2030 formed under the leadership of the United Nations and endorsed by countries throughout the world (Sustainable Development 2015). To achieve these themes, the SDGs include 17 diverse and ambitious goals and 169 targets designed to ensure effective strategies to meet current human needs while not compromising the ability of future generations to meet future needs.

The critical needs and developmental potential of the world's children are central features of the SDGs, represented by both goals and targets. At least 7 of the 17 SDGs are particularly relevant to young children: goals to end poverty and hunger; to ensure access to quality health, education, and sanitation; to achieve gender equality; and to reduce income inequality. The realization of these goals will be driven by aggressive targets aimed at improving early childhood globally, including ending malnutrition in children under age 5; reducing maternal, neonatal, and under-5 mortality; ensuring access to quality preprimary education for all; and promoting social protection policies. The Copenhagen Consensus, an expert panel of economists, identified 19 of the 169 SDG targets as offering a return of more than \$15 for every \$1 invested; 7 of those 19 relate directly to early childhood (Copenhagen Conference 2017). Thus, the success of the SDGs depends on ensuring that children throughout the world reach their developmental potential, thereby building the capacity for future generations to have the health, intelligence, creativity, and humanitarianism to move the global agenda forward.

M. M. Black (✉)

RTI International, Research Triangle Park, NC, USA

University of Maryland School of Medicine, Baltimore, MD, USA

e-mail: maureenblack@rti.org

K. A. Merseth

RTI International, Research Triangle Park, NC, USA

Fig. 5.1 Nurturing Care
(Black et al. 2017a, b)



Evidence from recent research has shown that for children to reach their developmental potential, they require nutrition, health, responsive caregiving, opportunities to explore and learn, and protection from environmental threats (Black et al. 2017a, b). These five domains are interdependent, meaning that deficiencies in one can compromise the others, and indivisible, meaning that all are necessary and that no single domain is sufficient. Together, they comprise Nurturing Care, a framework that has been shown to promote early development (Fig. 5.1) (Black et al. 2017a, b; Britto et al. 2017; Richter et al. 2017). Children’s need for a Nurturing Care Framework begins during the first 1000 days, from conception through age 24 months, and continues through early childhood (through age 8 years), with extensions throughout childhood and adolescence (Bundy et al. 2018).

This chapter addresses the SDGs from an early childhood development perspective. It is organized in five sections addressing the following interrelated objectives: (1) to examine how theories from developmental science establish a basis for achieving the SDGs; (2) to address how the timing of early experiences, particularly critical and sensitive periods, relates to early child development; (3) to review how the Nurturing Care Framework promotes early child development and strengthens countries’ capacity to meet the SDGs; (4) to present the implementation of the Nurturing Care Framework as a multi-sectoral process; and (5) to discuss how the Nurturing Care Framework can advance the SDGs.

Early Childhood Development Theories

Theories of child development illustrate that the development of motor, cognitive, language, socio-emotional, and self-regulation skills occurs through interactive processes guided by biological maturation and environmental interactions (Sameroff 2009). The orderly progression of physical growth and developmental skills across

cultures (Bornstein and Hendricks 2012) illustrates a species-specific biological progress. However, variation in individual children's experiences and interactions contributes to variability in the acquisition and strength of acquired skills. Social-ecological theory conceptualizes children's development as influenced by children's individual biological and psychological makeup, together with interactions that extend from their family as the primary context through a broad ecology of social, political, economic, and cultural systems (Bronfenbrenner and Morris 2007). The primary context for children's development is their home and interactions with their primary caregivers, generally their mother and father. Influences from the broader ecosystems are typically mediated through the family, leading to individual and cultural differences in children's development. Thus, consideration of the ecological systems is necessary to develop effective interventions to promote or alter children's development.

Similar to social-ecological theory, the transactional model emphasizes the interactions between children and their surroundings. Based on transactional theory, these interactions are dynamic and bidirectional, meaning that although caregivers may organize their children's daily routines and opportunities, caregivers are influenced by their beliefs about child rearing in general and by specific interactions with their child (Sameroff 2009). This back-and-forth process between caregivers and children shapes their current and future interactions, illustrating a dynamic interplay between the roles of nature and nurture in guiding child development. Children's development is also influenced by the broader ecosystem, through interactions with other family members and caregivers, peers, and school and community members.

Children reach their developmental potential when they acquire developmental competencies in multiple areas (e.g., motor, language, socio-emotional, self-regulatory, and cognitive skills), often established by age and/or cultural norms. These competencies enable children to take advantage of early learning and socialization opportunities provided by their families and communities. Multiple domains influence the acquisition of competencies, including health, nutrition, security and safety, responsive caregiving, and early learning; these domains interact with each other and can be mutually reinforcing through the process of development. All are necessary for Nurturing Care and occur through bi- and multidirectional interactions, often initiated by both children and caregivers and sustained by their interactions.

Over the past 15 years, there have been major advances in early child development science, policies, and endorsements. As documented in a recent series of papers and commentaries in *The Lancet* on early child development, (1) environmental influences on brain development during the first 1000 days impact health and well-being throughout the life-course and into subsequent generations (Black et al. 2017a, b); (2) global leaders of international agencies including the World Health Organization, UNICEF, and the World Bank Group have endorsed early child development investments, programs, and policies (Chan et al. 2017); and (3) over 50% of low- and middle-income countries have adopted multi-sectoral policies of early child development (Black et al. 2017a, b). Case studies show the advances that have been made globally, such as the Crece Contigo program in Chile, when

those efforts are supported by national policies and political leadership (Richter et al. 2017). These advances are poised to address the global crisis that over 40% of children under age 5 years in low- and middle-income countries (249 million children) are not reaching their developmental potential, largely due to early nutritional and environmental adversities, together with lack of responsive caregiving and learning opportunities (Black et al. 2017a, b; Lu et al. 2016).

Developmental Science and Timing

Developmental science addresses changes in learning and performance across multiple domains that occur throughout the life-course and the mechanisms driving changes. Timing is a critical aspect of the orderly process that defines early child development (Wachs et al. 2014). Based on the genetic process underlying child development, there are specific periods when children are particularly sensitive to exposures that stimulate neural development and behavior. The concept of critical and sensitive periods in children's development refers to species-specific expectations and requirements, including exposure to sensory stimuli that promotes the development of basic skills, such as hearing and vision, as well as more advanced skills, such as language. Timing of neural processes is also dependent on exposure to specific nutrients. For example, closure of the neural tube begins approximately 22 days after conception and is dependent on adequate sources of folic acid. During critical periods, adverse exposures or the absence of an expected exposure may result in irreversible consequences to development. During sensitive periods, there is a heightened sensitivity to expected exposures but with some flexibility regarding timing. Recent evidence provides more support for the flexible boundaries of sensitive periods, rather than the rigid boundaries of critical periods (Wachs et al. 2014).

Through the progressive nature of child development, early skills form the basis for subsequent skills, meaning that the timely acquisition of skills positions children for subsequent advances.

Information regarding neurodevelopmental timing may be useful in planning for interventions to promote early child development, particularly among children who are experiencing or are at risk for specific deficits. Children with nutritional deficiencies experience more benefits of intervention during the first 1000 days, when the link between nutrient needs and neural development is strongest, than later in life (Black et al. 2015). Likewise, children with a severe hearing impairment experience greater benefit when cochlear implants are placed at 3 months, rather than at 24 months (Ching et al. 2017). In contrast, the impact of interventions to promote early cognitive development may be less dependent on highly targeted timing. Home-based interventions in Jamaica delivered in the first 2 years of life that focused on early child development activities have shown beneficial effects on children's academic progress, psychological development, and behavior through adolescence and into adulthood (Walker et al. 2005, 2011; Gertler et al. 2014). Evidence also supports the beneficial impact of interventions beyond age 2 years (Black et al.

2015). A meta-analysis concluded that high-quality child-focused preschool interventions (for children aged 3–6) produced consistent, positive effects and reduced the achievement gap associated with socioeconomic differences (Rao et al. 2014).

Timing of Adversities

Early life adversities can have long-term physiological and epigenetic effects on brain development and affect life-course development, especially when multiple adversities, such as poverty, nutritional deficiencies, exposure to violence, and low-quality resources, co-occur (Evans and Kim 2013; Pavlakis et al. 2015). Poverty has long-term effects that can undermine health and emotional well-being, even among individuals who have moved out of poverty (Hackman and Farah 2009; Johnson et al. 2016).

Multiple studies have demonstrated that as the number of exposures to adversities accumulates during early childhood, the rates of lifelong adverse consequences increase. The Adverse Childhood Experiences (ACE) studies have shown that young children exposed to traumatic or abusive childhood events are predisposed as adults to health problems, including cardiovascular disease, high blood pressure, type 2 diabetes, obesity, cancer, and depression, alcoholism, smoking, and substance abuse (Shonkoff et al. 2012). Children raised in poverty are at increased risk for multiple adverse exposures, including environmental toxins, conflict, nutritional deficiencies, and lack of responsive caregiving and opportunities for learning.

Infants are highly dependent on their caregivers to protect them from adversities and to help them regulate their physiology and behavior. Caregivers can protect infants and help them acquire regulatory processes through responsive care, including routines for sleeping and feeding. Children gradually build self-regulatory skills that enable them to manage stress as they interact with peers and acquire the skills needed for academic and social success. In situations where caregivers are unable to protect and buffer their infants from adverse exposures, household stress and exposure to violence and conflict can cause disruptions in the hypothalamic-pituitary-adrenal axis and brain morphology, potentially placing young children at risk for subsequent physical and mental health conditions (Johnson et al. 2013). The physiological consequences of early adversities have been well documented and linked to difficulties with self-regulation and anxiety throughout childhood and adolescence (Burkholder et al. 2016).

In addition to the evidence from low- and middle-income countries showing that 249 million children under age 5 years (43%) are at risk of not reaching their developmental potential (Black et al. 2017a, b), one-third of preschoolers are not reaching cognitive or socio-emotional milestones (McCoy et al. 2016). Although estimates on the prevalence of children with disabilities in low- and middle-income countries are limited (Maulik and Darmstadt 2007), with disorders of hearing and intellectual disability cited most frequently, it is widely recognized that the prevalence of disabilities among young children is high.

Timing of Responsive Caregiving

Although much of the research has focused on the negative consequences of adverse exposures that occur during sensitive periods of development, there has also been interest in whether interventions during sensitive periods can prevent or reverse negative consequences or even enhance typical development. The exposure to multiple interactions and contexts that is central to developmental science (Sameroff 2009) provides opportunities for children to form multiple relationships and to differentiate among social interactions. Neuroscientific evidence has shown that maternal nurturance during early childhood can attenuate the detrimental effects of poverty by protecting early brain development (Britto et al. 2017; Johnson et al. 2016; Luby et al. 2013).

The Bucharest Early Intervention Project (BEIP) is a severe and striking example of both the negative consequences of being raised in an institutional setting and the mitigating effects of the responsive caregiving that occurred through placement into high-quality foster care. In this prospective, longitudinal study, 136 children who had been placed in state-run institutions in Romania shortly after birth were randomized to be placed in a high-quality foster home or to remain in the institution. In addition, a sample of 72 children from Romania who had never been institutionalized was recruited to serve as a comparison group. The three groups of children ranged in age from 6 to 31 months (mean age, 21 months) at recruitment and have been followed throughout childhood.

The young children who had been placed into institutional settings displayed low cognitive functioning at their initial evaluation. Children who were placed into high-quality foster homes prior to 18–24 months of age experienced recoveries in cognitive and language functioning (Nelson et al. 2007; Windsor et al. 2007) and normal cortisol and parasympathetic nervous system reactivity to stress (McLaughlin et al. 2015). In contrast, children placed into high-quality foster care beyond 24 months and those who remained in the Romanian institutions continued to demonstrate delayed cognitive and language skills and blunted stress reactivity. These findings highlight the centrality of sensitive periods both for the negative impact of adverse experiences and the beneficial effects of positive caregiving experiences and illustrate the sensitivity of the physiological and psychological development to environmental exposures.

Evidence from other sources has also shown the beneficial and mitigating effects of responsive caregiving on children's development. For example, in low-income communities of Pakistan, the relation between a home visiting intervention during the first 2 years of life and children's cognitive skills at age 4 was mediated through responsive caregiving, measured by the quality of current and past home stimulation (Obradović et al. 2016). Additional trials of responsive caregiving are underway, often integrated with health and/or nutrition. In Kenya, Pell and colleagues (Pell et al. 2016) are integrating neonatal survival with responsive caregiving by training volunteer community health workers and supplying them with a neonatal survival kit (e.g., clean delivery materials), a portable handheld electric scale, and strategies

to promote responsive caregiving through using gentle touches with infants while making eye contact and talking, responsive feeding, and singing.

Life-Course Perspective

Developmental science emphasizes that neural-environmental interaction occurs throughout life (Nelson et al. 2006) with deleterious effects of accumulated adversities and promotive effects of nurturance. Co-occurring early life adversities are particularly insidious to life-course development. In contrast, early child development services and opportunities for early learning can improve child outcomes during later schooling (Berlinski and Schady 2015). Coordination across preschool and primary schools promotes smooth transitions between grades, enables children to build on their preschool skills, and facilitates a coordinated, sequential strategy for promoting early learning, which provides support for children across the life-course (Berlinski et al. 2009).

Recent longitudinal follow-up studies from early intervention trials in Jamaica and North Carolina illustrate the longitudinal benefits in wage earning (Gertler et al. 2014) and physiological markers, such as blood pressure (Campbell et al. 2014), resulting from very early interventions. These findings highlight that interventions early in life can alter life-course trajectories with benefits seen decades after the intervention.

Nurturing Care

Nurturing Care represents a stable environment that is sensitive to children's health and nutritional, cognitive, and psychological needs, with protection from threats, opportunities for early learning, and interactions that are responsive, emotionally supportive, and developmentally stimulating (Black and Aboud 2011; Black et al. 2017a, b; Britto et al. 2017). The home environment and interactions with primary caregivers form the basis of Nurturing Care, beginning during the first 1000 days and extending throughout early childhood. The daily routines that families establish for feeding, sleeping, hygiene, and play embody Nurturing Care. In addition to ensuring that children's health and nutritional needs are met, Nurturing Care includes protection from stress, conflict, and toxins, along with opportunities for early learning (e.g., storytelling, singing, and playing) and responsive caregiving (nurturance and responsiveness to child's signals).

The Nurturing Care Framework is well suited to be a central strategy for the success of the SDGs because it relies on an enabling environment that supports families; is based on sustainable systems of accountability that include monitoring, evaluation, and continuous quality improvement; and operates through country-specific policies and leadership (Black et al. 2017a, b; Richter et al. 2017) (see Fig. 5.2).

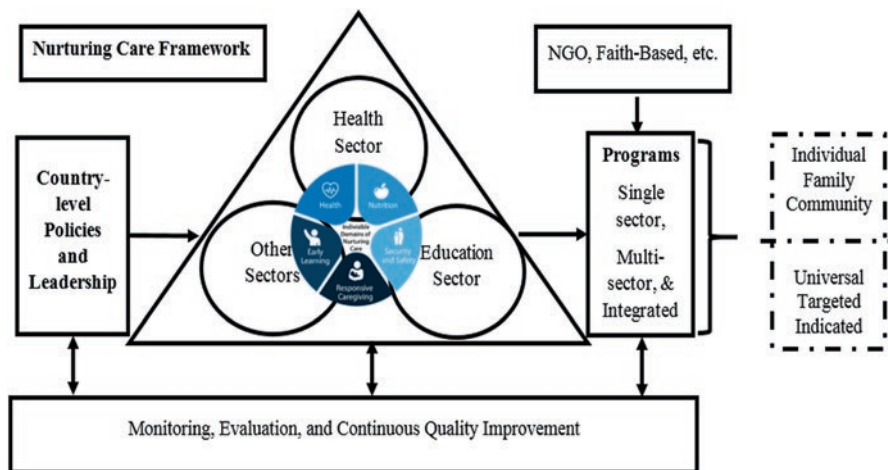


Fig. 5.2 Nurturing Care Framework

Family Resources and Maternal Education

Family resources have been linked to children's development in high-income countries (Bradley and Corwyn 2002). Recent studies from Madagascar, India, Indonesia, Peru, and Senegal have shown similar associations between maternal education and family assets with children's development, favoring children with better educated mothers and more family assets (Fernald et al. 2011, 2012). In Brazil, activities with low economic costs, such as storytelling, were effective in promoting development among young children (Barros et al. 2010). In addition, the effects of interventions may vary by family assets. Among 12- to 36-month-old children from India, Pakistan, and Zambia with and without birth asphyxia, the effects of an early developmental intervention on cognitive development were moderated by family assets (Bann et al. 2016). The intervention was effective in promoting developmental skills only among children from low-asset families. By the conclusion of the intervention period, their performance did not differ from the performance of children in high-asset families. The intervention did not lead to benefits among children in high-asset families, presumably because their families were providing the necessary stimulation without depending on the intervention.

Thus, in low- and middle-income countries, as well as in high-income countries, household assets are often positively associated with young children's growth and development (Bradley and Putnick 2012). A study of low-asset families in rural India found that maternal education and a home environment characterized by nurturance and early learning opportunities were positively related to infants' growth (weight and length) and development, suggesting the compensatory effects of maternal education, nurturance, and early learning opportunities (Black et al. 2016). Young children benefit not only from family assets but also responsive caregiving and early learning opportunities (Bradley and Putnick 2012). The implications are

striking because preventing poor growth, particularly stunting, has been associated with academic and economic advantages throughout life (Hoddinott et al. 2013; Sudfeld et al. 2015; Walker et al. 2011). Early learning lays the foundation for later learning and is essential (although not sufficient) for the development of optimized brain structure and functioning.

Enabling Environment

The implementation of the Nurturing Care Framework is dependent on an enabling environment. At the household level, an enabling environment means that caregivers have the physical and mental health, resources, and capacity to provide Nurturing Care. For example, caregivers burdened by mental health problems often lack the mood stability and emotional capacity required to consistently meet their children's emotional needs. Maternal depressive symptoms, even intermittent symptoms, can undermine maternal well-being and negatively impact parenting behaviors and children's development (Wachs et al. 2009). Children of mothers with depressive symptoms are at risk for difficulties in attention regulation, attachment, adaptive skills, and externalizing and internalizing behavior (Goodman et al. 2011), especially early in life when they are highly dependent on their mothers and sensitive to variations in interpersonal relationships (Campbell et al. 2004). Strategies such as the Thinking Healthy Programme, implemented by community health workers in Pakistan, have been effective in reducing depressive symptoms and promoting maternal psychosocial well-being (Rahman et al. 2008a, b).

Current State of Nurturing Care

As national governments and global leaders express interest in adopting the Nurturing Care Framework as a strategy to promote early child development and to achieve success with the SDGs, there is a strong need to develop systems and metrics to help countries monitor and evaluate the effectiveness of their progress toward both. In addition to evaluating changes on SDG indicators, such as the number of children with access to quality early childhood development, care, and preprimary education (Target 4.2), countries need systematic information on indicators of services, such as reach, coverage, cost, and requirements for training, coaching, and supervision. This information can be generated by a system of accountability that includes valid indicators, quality data, and timely feedback, thereby facilitating continuous quality improvement (Meyers et al. 2012). Valid, cost-effective, and feasible monitoring and evaluation strategies are also necessary to identify communities and children at risk, which is essential to ensure equity (Black and Hurley 2016). The “data revolution” recommended for the post-2015 agenda (United Nations 2013) and currently underway is making it possible for countries to manage large data

sets, close data gaps, modernize systems of data collection, and conduct data analytics – technologies and capacities that will enable the necessary systems approach to Nurturing Care.

International and private agencies are developing intervention strategies to address aspects of the Nurturing Care Framework, frequently by adapting existing programs. Some programs are very innovative with a broad reach and delivery platforms that include health-care clinical sites, homes, community sites, and digital media. However, there are few standards or definitions of quality service delivery. Insufficient evidence on characteristics of optimal program timing, dosage, and duration has led to variability in program designs and service delivery modalities. Intervention eligibility and targeting parameters also vary and may include individual caregivers, caregiver and child, family, and community groups. In addition, the scope of intervention coverage often varies. Some countries focus on universal interventions delivered at the population level, often through mass media. Others deliver interventions to selected communities, based on risk factors, such as high rates of undernutrition or poverty. Finally, others initiate screening and identify individual children and families to receive services. The variability across program and delivery characteristics encumbers systematic evaluation to inform subsequent programming. Evaluations can inform country policies and collaboration with governmental programs (potentially through public-private partnerships), with the goal of ensuring quality and sustainability.

Nurturing Care as a Multi-sectoral Process

Individual interventions targeting health, nutrition, stimulation (opportunities to learn), responsive caregiving, and protection from environmental threats delivered separately during the first 1000 days can benefit early childhood development (Aboud and Yousafzai 2015; Vaivada et al. 2017). However, it is inefficient, costly, and time-consuming to implement multiple interventions. This inefficiency has led to recommendations that interventions integrate health, nutrition, responsive caregiving, and other domains of Nurturing Care (Black and Dewey 2014). Yet there are few evaluations of either research interventions or programs that integrate nutrition and responsive caregiving interventions (Grantham-McGregor et al. 2014) and virtually none that incorporate all five domains of Nurturing Care.

The health sector plays a major role in ensuring children's pre- and postnatal health and development (Vaivada et al. 2017) and serves as an entry point for Nurturing Care in many countries. Nutrition is a central component of children's early health and development. Stunting (height-for-age, 2 standard deviations below expectations), a marker of chronic undernutrition, serves as a proxy for early child development. Recent evidence from Bangladesh and Vietnam suggests that advances in young children's height-for-age are associated with modifiable environmental factors, including socioeconomic status, food security, maternal education, and hygiene, suggesting that environmental interventions may lead to reductions in

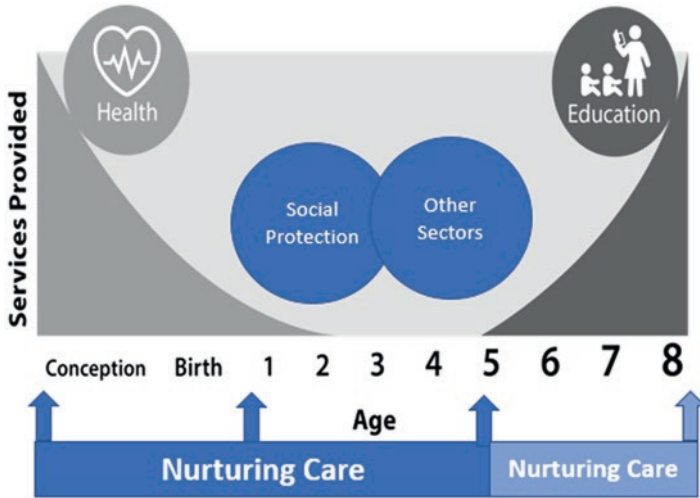


Fig. 5.3 Gap between health and educational services (Black et al. 2017a, b)

stunting (Nguyen et al. 2017). The education sector plays a major role in enabling children to achieve their intellectual potential, with increasing attention to the benefits of preprimary education on children’s subsequent academic performance (Berlinski and Schady 2015), cognitive development (Rao et al. 2014), total years of schooling (Engle et al. 2007), and efficiency through primary school (Crouch and Merseeth 2017). Preprimary enrollments have increased globally from 31% in 2000 to 49% in 2015 (UNESCO Institute for Statistics 2017), and SDG Target 4.2 calls for all children to have access to quality preprimary education by 2030. Although children’s health, nutrition, and education are interdependent, there has been limited coordination across sectors. The result is a gap between the end of routine health services and the initiation of formal education services (Fig. 5.3). This gap from approximately 2–5 years of age is a sensitive period in children’s development and represents a missed opportunity to ensure that children are receiving Nurturing Care and are reaching their developmental potential.

Nurturing Care and the SDGs

Recent research has focused on the first 1000 days, with an emphasis on both the vulnerabilities and capacities for change that occur during this period. Although reaching developmental potential early in life increases the odds of success throughout life, early success cannot protect children from subsequent adversities. Children need Nurturing Care throughout early childhood, particularly during the preschool years when there is often a gap in services (Black et al. 2015; John et al. 2017). Neural-environmental interactions occur throughout life (Nelson et al. 2006), and children continue to be impacted by both negative and positive experiences.

The impressive progress that has been made in reducing mortality among children under 5 years of age by more than 50% (from 91 deaths per 1000 live births in 1990 to 43 in 2015) illustrates the successful application of science into practice with meaningful results. Success in achieving the equity and universal prosperity for this generation and the next envisioned by the SDGs will require a citizenry and workforce with the capacity to address both technological and humanitarian issues. With a foundation in developmental science, strong supportive evidence, and necessary advances in a systems perspective, the Nurturing Care Framework is well positioned to increase the number of children reaching their developmental potential and to demonstrate advances of equity and universal prosperity in attainment of the SDGs.

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Maureen M. Black is a Distinguished Fellow in the International Development Group at RTI International and the John A. Scholl and Mary Louise Scholl Endowed Professor at the University of Maryland School of Medicine. Dr. Black is a pediatric psychologist who specializes in the evaluation of multilevel interventions to promote healthy growth and development among young children in low-income communities in the USA and low-income countries throughout the world.

Katherine A. Merseth leads the early childhood practice area in the International Education Division at RTI International. She provides strategic and technical leadership for RTI's early childhood education programming. Her research interests include access to and equity of kindergarten education in low- and middle-income countries. Katherine previously worked at Save the Children USA, Creative Associates, and Winrock International.